Tribioscience

Superoxide Dismutase, Enzyme Activity

Catalog	Unit
TBP0087-10KU	10 KU
TBP0087-50KU	50 KU

Product Details

Form: Freeze-dried

Solubility: Soluble in distilled water or dilute buffer

Stability: -20° C; -4° F

Activity: 3000 U/mg protein

Protein: 95%

Catalog No.: 110A3000

Unit Definition

That amount of enzyme which, under specified conditions of the assay, will cause a 50% inhibition in the rate of reduction of ferricytochrome C.

Assay Method

The method of assay is based on the ability of superoxide dismutase to compete with ferricytochrome C for superoxide anions generated by the xanthine oxidase system. This results in inhibition of the rate of reduction of ferricytochrome C. The method of assay has been described by McCord and Fridovich.

Applications

Superoxide dismutase (SOD) (EC 1.15.1.1) catalyzes the destruction (dismutation) of superoxide free radical ions as follows:

$$2O_2^- + 2H^+ \xrightarrow{SOD} O_2 + H_2O_2$$

The superoxide (O2-) ion is believed to be responsible for lipid peroxidation and peroxidative hemolysis of erythrocytes. The action of superoxide dismutase, therefore, results in protection of the biological integrity of cells and tissues against the harmful effects of superoxide free radicals.

Superoxide dismutase is widely distributed in both plants and animals. It occurs in high concentrations in brain, liver, heart, erythrocytes and kidney. Three superoxide dismutases have been characterized according to their metal content. The enzyme from bovine and human erythrocytes contains copper and zinc, the one from chicken and rat liver mitochondria contains manganese while the enzyme from E. coli contains iron. Superoxide dismutase from bovine erythrocytes has a molecular weight of 32,500.

Orgotein is the generic name, adopted by the United States Adopted Names (USAN) for Cu-Zn superoxide dismutases. Clinical trials indicate that orgotein has strong anti-inflammatory properties with almost no toxic side effects.

Reagents

1. 0.05 M Potassium phosphate buffer, pH 7.8 containing 0.0001 M EDTA.
2. 0.0003 M Ferricytochrome C (3.9 mg/ml) in buffer.
3. 0.0015 M Xanthine (0.25 mg/ml) in buffer.
4. Xanthine oxidase solution (approximately 0.03-0.05 mg/ml in buffer). Prepare fresh prior to assay.
5. Superoxide dismutase (SOD) in buffer. Dilute in buffer to yield a final concentration of 100-200 U/ml. Must be prepared fresh immediately prior to assay.

Calculation

$$\text{Activity (U/mg)} = \frac{(\text{Diln. of SOD yielding } \Delta E_{550nm/min} \text{ of } 0.0250)(\text{Total Vol.})(\text{Enz. Diln.})}{(0.1)(\text{mg Enz./ml})}$$

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